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10/587,169

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Hajime Suzuki

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EXAMINER

NOTE, JANIS L

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/587,169	<b>Applicant(s)</b> SUZUKI ET AL.	
	<b>Examiner</b> Janis L. Dote	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/25/06</u> .   | 6) <input type="checkbox"/> Other: _____                          |

1. The examiner acknowledges the cancellation of claim 2, the amendments to claims 1, 7, and 8, and the addition of claims 9-18 filed on Jul. 25, 2006. Claims 1 and 3-18 are pending.

2. The examiner notes that the amendments to claims 1, 7, and 8 did not comply with 37 CFR 1.121. In claim 1, not all of the added text was underlined. In claims 7 and 8, the deletion of text, e.g., [6], was indicated by single brackets and strike-through.

37 CFR 1.121 reads: "[W]hen claim text with markings is required. All claims being currently amended . . . shall . . . be submitted with markings to indicate changes that have been made relative to the immediate prior version of the claims. The text of any added subject must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets [i.e., [[ ]]] placed before and after the deleted characters may be used to show deletion of five or fewer consecutive letters" (emphasis added).

Nonetheless, in the interest of compact prosecution, the "Listing of the claims," which includes amended claims 1, 7, and 8, filed on Jul. 25, 2006, has been entered and replaces all prior versions and listings of claims in the instant application.

Applicants are reminded that in response to this office action, any future amendments to the claims should comply with 37 CFR 1.121.

3. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite in the phrase "comprising a conductive support and a photosensitive layer provided on the conductive layer, with an undercoat layer provided between the support and the photosensitive layer" (emphasis added) for lack of unambiguous antecedent basis for the "conductive layer" recited in claim 1. Claim 1 does not previously recite the presence of a conductive layer. It is not clear whether the claim requires a conductive layer in addition to the conductive support.

Claim 1 is further indefinite because it is missing a terminal period. It is not clear whether the claim is complete.

Claims 7 and 9-13 are indefinite in the phrase "electrophotographic apparatus in which a contact charging means is applied to the electrophotographic photoreceptor according to claim . . ." because it is not clear how a device, i.e., the contact charging means, is applied to the photoreceptor. It is also not clear whether the photoreceptor is a component of the apparatus. The claims do not positively recite that the apparatus comprises the photoreceptor but merely recites that the contact charging means in the apparatus is applied to the photoreceptor.

Claims 8 and 14-18 are indefinite in the phrase "electrophotographic apparatus in which an exposure means using a semiconductor laser is applied to the electrophotographic photoreceptor according to claim . . ." because it is not clear how a device, i.e., the exposure means using a semiconductor laser, is applied on the photoreceptor. Nor is it clear how a device, i.e., the exposure means, uses another device, i.e., the semiconductor laser. Furthermore, it is not clear whether the photoreceptor is a component of the apparatus. The claims do not positively recite that the apparatus comprises the

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photoreceptor but merely recites that the exposure means in the apparatus is applied to the photoreceptor.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1 and 3-18 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Japanese Patent 2004-118161 (JP'161). See the Japanese Patent Office (JPO) machine-assisted translation of JP'161 for cites.

JP'161 discloses a photoconductor (also known in the electrophotographic arts as a photoreceptor) comprising an "uncut" aluminum drum having thereon an undercoat layer and a photosensitive layer that comprises a charge generation layer and a charge transport layer. See the JPO translation, paragraphs 0060-0063, example 11 in paragraph 0073, and drawing 2. JP'161 further teaches an electrophotographic apparatus comprising a contact charging means, an exposure device comprising a semiconductor laser, and its photoconductor. JPO translation, claims 6 and 7, and paragraphs 0058 and 0079. The contact charging means and exposure device meet the contact charging means and exposure means recited in instant claims 7 and 9-13 and claims 8 and 14-18, respectively.

The "uncut" aluminum drum meets the conductive substrate limitation recited in instant claim 6. The charge generation layer comprises an oxytitanium phthalocyanine pigment as the charge generation material. The oxytitanium phthalocyanine exhibits a CuK $\alpha$  X-ray diffraction pattern having a main

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diffraction peak at a Bragg angle ( $2\theta \pm 0.2^\circ$ ) of  $27.3^\circ$ , which meets the oxytitanium phthalocyanine limitation recited in instant claim 1. See the translation, paragraph 0021 and drawing 2.

The undercoat layer comprises a first layer and a second layer on the first layer. The first layer comprises the polyimide resin of formula X-1 and titanium oxide particles in a weight ratio of 1:1 and has a thickness of 20.0  $\mu\text{m}$ . The second layer comprises a melamine alkyl resin as a thermosetting resin and titanium oxide particles and has a thickness of 1.0  $\mu\text{m}$ .

Paragraph 0060. The undercoat two-layer structure meets the two-layer undercoat limitations recited in instant claim 5. The total undercoat layer thickness of 21.0  $\mu\text{m}$  is within the thickness range of 3.0 to 50  $\mu\text{m}$  recited in instant claim 3.

The 1:1 weight ratio of the polyimide resin X-1 and titanium oxide particles in the first layer is within the polyimide resin to titanium oxide weight ratio range of 3:1 to 1:4 recited in instant claim 4.

In example 11, JP'161 does not explicitly identify the polyimide resin of formula X-1 as one of the polyimide resins listed in the Markush group recited in instant claim 1.

However, according to JP'161, the polyimide resin of formula X-1 is represented by formula (1) in paragraph 0011 of the translation, where n is "an integer showing degree of



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polymerization" and X is represented by formula X-1 in paragraph 0012. JP'161 teaches that a hydrogen atom Y on each of the phenylene groups in formula X-1 may be replaced with an alkyl group, a halogen atom, an alkoxy group, or an aryl group. Translation paragraph 0012. When Y groups are both hydrogen atoms the JP'161 polyimide resin of formula X-1 is within the polyimide resin compositional limitations recited in instant claim 1. Hydrogen atom is the simplest substituent group and is one of the five substituent species listed in paragraph 0012 of JP'161. The group of five equivalent Y substituent groups is sufficiently small that disclosure of the group is a full disclosure of the individual members. See In re Schaumann, 197 USPQ 5 (CCPA 1978) (disclosure of a small genus is a teaching of each member of the genus). Based on the teachings in JP'161, it would have been clear to a person having ordinary skill in the art that the inventors in JP'161 clearly envisaged a polyimide resin of formula X-1 when Y is a hydrogen atom. Thus, JP'161 teaches an undercoat layer that meets the undercoat compositional limitations recited in instant claims 1 and 3-5.

10. Claims 1, 3-5, 7-12, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0033428 A1 (Niimi'428), as evidenced by Kirk-Othmer, Encyclopedia of

Chemical Technology, fourth edition, Vol. 15., page 21, lines 12-19 (Kirk-Othmer) and the ACS File Registry RN 26201-32-1, combined with Japanese Patent 2002-229236 (JP'236). See the Japanese Patent Office (JPO) machine-assisted translation of JP'236 for cites.

Niimi'428 exemplifies a photoreceptor comprising an aluminum cylinder as the conductive substrate, an undercoat layer having a thickness of 3.5  $\mu\text{m}$ , and a photosensitive layer comprising a charge generation layer and a charge transport layer. Example 8 in paragraphs 0208 to 0212. Niimi'428 further teaches an electrophotographic imaging apparatus comprising a contact charging roller, an exposure device comprising a laser diode having a wavelength of 780 nm, and its photoreceptor. See Fig. 3 and paragraph 0224. It is well known in the art of lasers that a semiconductor laser is also called a "diode laser," i.e., laser diode. See Kirk-Othmer, p. 21, lines 12-19. The contact charging means and exposure device meet the contact charging means and exposure means recited in instant claims 7 and 9-12 and claims 8 and 14-17, respectively.

In example 8, the charge generation layer comprises a particular titanyl phthalocyanine pigment that exhibits a  $\text{CuK}\alpha$  X-ray diffraction pattern having a main diffraction peak at a Bragg angle ( $2\theta \pm 0.2^\circ$ ) of  $27.3^\circ$ , which meets the oxytitanium

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phthalocyanine limitation recited in instant claim 1.

Paragraph 0019; example 1, titanylphthalocyanine pigment 1, in paragraph 0186 and in example 4 in paragraph 0194; and Fig. 9. Niimi'428 does identify its titanylphthalocyanine pigment as oxytitanium phthalocyanine. However, as evidenced by the ACS File Registry RN 26201-32-1, it is well known that titanyl phthalocyanine is also identified as oxotitanium phthalocyanine. The undercoat layer thickness of 3.5  $\mu\text{m}$  is within the undercoat layer thickness range of 3.0 to 50  $\mu\text{m}$  recited in instant claim 3.

Niimi'428 does not exemplify a photoreceptor comprising the undercoating layer as recited in the instant claims.

JP'236 teaches undercoat layers comprising a polyimide precursor resin and a polyimide resin that is within the compositional limitation recited in instant claim 1. See the JPO translation, paragraphs 0006-0010, and for example, example 1 in paragraph 0045. In JP'236 example 1, JP'236 exemplifies an undercoat layer comprising the polyimide precursor resin of formula  $R_1-1$  and the polyimide resin of formula  $R_2-1$ . The undercoat layer has a thickness of 1.0  $\mu\text{m}$ . Translation, paragraphs 0010 and 0045. The polyimide resin of formula  $R_2-1$  is within the polyimide resin compositional limitations recited in instant claim 1. JP'236 further teaches

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that the undercoat layer may have thickness of 0.01 to 20  $\mu\text{m}$ , preferably of 0.1 to 10  $\mu\text{m}$ . Translation, paragraph 0019. Both JP'236 ranges overlap the thickness range of 3.0 to 50  $\mu\text{m}$  recited in instant claim 3. The upper limits, i.e., 20 and 10  $\mu\text{m}$ , of the JP'236 thickness ranges are with the thickness range recited in instant claim 3.

According to JP'236, when a photoreceptor comprises its undercoat layer between the conductive substrate and the photosensitive layer of the photoreceptor, the conductive substrate defects are covered without degrading the electrostatic properties of the photoreceptor. The photoreceptor has excellent stability when repeatedly used and in environmental characteristics. Translation, paragraphs 0005 and 0068.

JP'236 also teaches that the undercoat layer comprising the polyamide resin and the polyimide resin may further comprise titanium oxide particles. According to JP'236, the titanium oxide particles may be present in the amount of 1 to 4 times the amount of the polyimide precursor resin and the polyimide resin. Translation, paragraph 0024. In example 1 of JP'236, the undercoat layer comprises 6 parts by weight of the polyimide precursor resin R<sub>1</sub>-1 and 4 parts by weight of the polyimide resin R<sub>2</sub>-1. Translation, paragraph 0045. When titanium oxide

particles are added in an amount of 10 parts by weight to the undercoat layer of example 1 of JP'236, i.e., 1 times the amount of the polyimide precursor and polyimide resins, the weight ratio of the polyimide resin to the titanium oxide particles would be 0.4, which is within the weight ratio of polyimide resin to titanium oxide particles of 3:1 to 1:4 recited in instant claim 4. According to JP'236, when titanium oxide particles are added to the undercoat layer, the undercoat layer's dielectric constant increases and a thicker undercoat layer can be used and dispersibility improves. Translation, paragraph 0012.

JP'236 further teaches that the undercoat layer comprising the polyamide resin and the polyimide resin may be coated with another undercoat layer comprising a thermoplastic or thermosetting resin, such as a melamine alkyd resin. Translation, paragraphs 0013, 0022, and 0025 and for example, example 5 in paragraph 0052. According to JP'236, said two-layered undercoat layer suppresses the "accumulation of rest potential" and improves the "picture quality." Paragraphs 0013 and 0022. The two-layered undercoat layer meets the two-layer structure recited in instant claim 5.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in JP'236, to use the

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undercoat layers comprising the polyimide precursor R<sub>1</sub>-1 and polyimide resin R<sub>2</sub>-1 as exemplified in example 1 of JP'236, such as those having a layer thickness as recited in the instant claims, e.g., 3.5  $\mu\text{m}$ , comprising titanium oxide particles in an amount within instant claim 4, e.g., a weight ratio of polyimide resin to titanium oxide particles of 4 to 10, or coated with a layer comprising a thermosetting or thermoplastic resin, as taught by JP'236, as the undercoat layer in the photoreceptor disclosed by Niimi'428. It would have also been obvious for that person to use the resultant photoreceptor in the electrophotographic imaging apparatus disclosed by Niimi'428. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor and an imaging apparatus comprising said photoreceptor that have excellent stability when used repeatedly and in environmental characteristics as disclosed by JP'238.

11. Claims 6, 12, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'428, as evidenced by Kirk-Othmer and the ACS File Registry RN 26201-32-1, combined with JP'236, as applied to claims 1, 7, and 8 above, further combined with Japanese Patent 10-123737 (JP'737). See the JPO machine-assisted translations of JP'236 and JP'737 for cites.

Niimi'428, as evidenced by Kirk-Othmer and the ACS File Registry RN 26201-32-1, combined with JP'236 renders obvious a photoreceptor and an imaging apparatus comprising said photoreceptor, as described in paragraph 10 above, which is incorporated herein by reference.

Neither Niimi'428 nor JP'236 exemplifies a photoreceptor comprising a conductive substrate as recited in instant claim 6.

JP'737 teaches a photoreceptor conductive substrate that meets the conductive substrate limitation recited in instant claim 6. The conductive substrate is formed from an "uncut" aluminum pipe produced by an extrusion drawing-out process that is subjected to a liquid honing treatment. Translation, paragraph 0015, and for example, example 1 in paragraph 0056. According to JP'737, the uncut aluminum pipe according to its invention, has good surface smoothness. JP'737 teaches that when its conductive substrate is used as the conductive substrate in a photoreceptor, the photoreceptor stably provides high quality images without the generation of white dots and black dots. Translation, paragraphs 0012 and 0066.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in JP'737, to use the uncut conductive aluminum pipe taught by JP'737 as the conductive substrate in the photoreceptor rendered obvious over

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the combined teachings of Niimi'428 and JP'236. It would have also been obvious for that person to use the resultant photoreceptor in the electrophotographic imaging apparatus disclosed by Niimi'428. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor and an imaging apparatus comprising said photoreceptor that provide high quality images without the generation of white dots and black dots as disclosed by JP'236.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Sandra Sewell, whose telephone number is (571) 272-1047.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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/Janis L. Dote/  
Primary Examiner, Art Unit 1795

JLD  
May 24, 2008